

CLAIMS

What is claimed is:

1. An assembly for administering external counterpulsation therapy to a patient, comprising:

5 an inflatable cuff that is adapted to be placed about a selected portion of the patient's body;

a fluid moving device that moves noncompressed fluid;

an inflate conduit interconnecting said cuff and said fluid moving device that permits noncompressed fluid to move through said inflate conduit toward said cuff in 10 a first direction to selectively inflate said cuff;

a deflate conduit interconnecting said cuff and said fluid moving device that permits noncompressed fluid to move through said deflate conduit in a second direction to selectively deflate said cuff; and

15 a valve that selectively couples said cuff to said conduits to thereby selectively inflate and deflate said cuff.

2. The assembly according to claim 1, further comprising a plurality of said cuffs and wherein a first pair of said cuffs are adapted to be received about the patient's calves, a second pair is adapted to be received about the patient's thighs 20 and a third cuff is adapted to be received about the patient's buttocks and wherein said cuffs are inflated in sequence from said first pair to said third cuff.

25 3. The assembly according to claim 1, wherein said fluid comprises air and said moving device comprises a cylinder and a moving member that moves reciprocally within said cylinder to move noncompressed air in a first and second direction, respectively.

4. The assembly according to claim 3, further comprising an electronic controller, and a linear actuator which moves said moving member within said cylinder responsive to said electronic controller.

5 5. The assembly according to claim 4, further comprising a valve arrangement that connects said conduits and air moving device such that the noncompressed air moves in the first direction through said inflate conduit and a vacuum is created in said deflate conduit regardless of the direction of movement of said moving member within said cylinder.

10 6. The assembly according to claim 5, further comprising a release conduit and a valve arrangement selectively connecting said inflate conduit to atmosphere such that the noncompressed air in said inflate conduit can move through said release conduit to atmosphere.

15 7. The assembly according to claim 5, further comprising a release conduit in a valve arrangement selectively connecting said deflate conduit to atmosphere such that the noncompressed air in said deflate conduit can be selectively vented to atmosphere.

20 8. The assembly according to claim 1, further comprising an exhaust valve coupled with said conduits to selectively allow air to vent to atmosphere from said conduits.

25 9. The assembly according to claim 1, further comprising an electronic controller that controls said fluid moving device and a computer communicating with

a plethysmograph and said electronic controller, said computer being programmable to achieve a desired counterpulsation therapy regime and being programmed to permit said moving device to operate only after an operator of said assembly completes a series of predetermined steps to initiate the desired counterpulsation therapy regime.

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10. A counterpulsation therapy assembly, comprising:

an inflatable cuff that is adapted to be placed about a selected portion of a patient's body;

10 a conduit in communication with said cuff;

15 a fluid moving device including a housing having a first port and a second port and a moving member that moves within said housing in a first direction to move noncompressed fluid out of said housing through said first port and moves within said housing in a second direction to move noncompressed fluid out of said housing through said second port; and

20 a valve that selectively couples said conduit to said first port when said moving member moves in said first direction and selectively couples said conduit to said second port when said moving member moves in said second direction such that the noncompressed fluid exiting from the housing moves into and at least partially through said conduit whenever said moving member moves within said housing.

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11. The assembly according to claim 10, further comprising a plurality of valves including a first valve selectively connecting said cuff to said conduit allowing noncompressed fluid to move into said cuff, a second valve selectively connecting said conduit to atmosphere allowing said cuff to be vented to atmosphere

through a portion of said conduit.

5 12. The assembly according to claim 10, wherein there are a plurality of said cuffs and wherein a first pair of said cuffs are adapted to be received about the patient's calves, a second pair is adapted to be received about the patient's thighs and a third cuff is adapted to be received about the patient's buttocks and wherein said cuffs are inflated in sequence from a most distal portion of said first pair to a most proximal portion of said third cuff.

10 13. The assembly according to claim 10, further comprising an electronic controller and a linear actuator that cyclically moves said moving member in the first and second directions responsive to said controller.

15 14. The assembly of claim 10, wherein said moving member causes noncompressed air to enter said housing through said second port when said moving member moves in said first direction and through said first port when said moving member moves in said second direction and wherein said valve includes a first and second check valve that selectively couple said conduit to said second port when said moving member moves in said first direction and to said first port when said moving member moves in said second direction, respectively.

20 25 15. The assembly of claim 10, wherein said conduit comprises an inflate conduit and further comprising a second valve and a deflate conduit that is in communication with said cuff, said fluid moving device and said second valve, and wherein said second valve selectively couples said deflate conduit to said second port of said moving device when said moving member moves in said first direction and

selectively couples said deflate conduit to said second port of said moving device when said moving member moves in said first direction such that the non-compressed fluid within said deflate conduit moves into said housing whenever said moving member moves within said housing.

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16. The assembly of claim 15, further comprising a plurality of cuffs and a plurality of branch conduits coupled with said cuffs, respectively, and wherein a valve arrangement selectively couples each of said branch conduits to said conduit or said deflate conduit, respectively.

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17. The assembly of claim 16, comprising a first valve that selectively couples said branch conduits to said conduit, a second valve that selectively couples said branch conduits to said deflate conduit and a third valve that selectively couples said branch conduit to atmosphere.

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18. A method of operating a counterpulsation system having at least one inflatable cuff that is adapted to be placed about a selected portion of a patient's body and a conduit coupled to said cuff, comprising the steps of:

- (A) moving noncompressed air through the conduit toward the cuff;
- (B) selectively inflating the cuff, using the air from the conduit;
- (C) moving noncompressed through the conduit and out of the cuff to selectively deflate the cuff.

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19. The method of claim 18, further comprising selectively coupling the conduit to atmosphere to thereby selectively allow noncompressed air from the conduit to exit into the atmosphere.

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20. The method of claim 18, wherein the counterpulsation system includes a plurality of cuffs and steps (A) through (C) are performed cyclically and sequentially with each cuff in a preselected order.